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# The spread of barnyard grass (*Echinochloa crus-galli*) and other invasive alien plant species through certified seed lots imported to Finland

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Seed Unit

**Nordic IAS webinar**

Pathways of IAS - Preventing spread through knowledge and action

**25.03.2026**

# Barnyard grass (rikkakananhirssi, hönshirs) and green foxtail (viherpantaheinä, kavelhirs) as a weeds

Effective seed producer, thousands of seed in large individuals

New individuals can grow throughout growing season

Stands cutting, growing point at ground level

Seeds survive in seedbank 10 years

Produces allelochemicals, prevents other species to grow

Efficient nitrogen user

**C4 plant**, photosynthesis is efficient in high temperatures

Barnyard grass and green foxtail are not listed as harmful alien species in Finland and they are not prohibited as a species in certified seed.



# 'Invasive arable weeds' research programme



3 years programme (2025 - 2027), funded by Agricultural Development Fund Makera.

Participants: Natural Resources Institute Luke (responsible researcher professor Terho Hyvönen), National Land Survey of Finland NLS, Nylands Svenska Lantbrukssällskap (NSL) and Finnish Food Authority

**Goals of the programme:** 1: Spread pathways and distribution.  
2: New distribution survey and effective control methods  
3: Knowledge transfer to seed importers/packagers

**Targeted species:** Barnyard grass (*Echinochloa crus-galli*), American barnyard grass (*E. muricata*), Green foxtail (*Setaria viridis*), Yellow foxtail (*S.pumila*)  
Black nightshade (*Solanum nigrum*), hairy nightshade (*S.nitidibaccatum*)



# Long distance spread pathway: weeds in imported certified seed lots



Collaboration with Professor Terho Hyvönen (Natural Resources Institute Luke)

Imported certified seed lots from years 2013-2024

Seed importer has to send the information to Seed Unit if the imported seed lot is used for production of certified seed, used for mixtures and if new packaging is needed. Weed species mentioned in the seed lots certificate are stored in database

**Note:** not all the seed lots imported to Finland are reported to Seed Unit

foreign certificate does not always include all the weeds found in the seed lot  
weed seed are present also in feed/fodder.

**Publication:** Sami Markkanen and Terho Hyvönen, Kasvinsuojelulehti Vol 58 Nro 1-2 (2025): Rikkakananhirssin ja eräiden muiden rikkakasvien esiintyminen Suomeen tuoduissa siemenerissä

# The origin of seed lots (country of production)



3520 seed lots, 17,5 million kg, presenting 74 species

Mostly forage species (timothy red fescue 2 M kg)

Cereals (Barley 1,5 M kg, Rye 0,9 M kg)

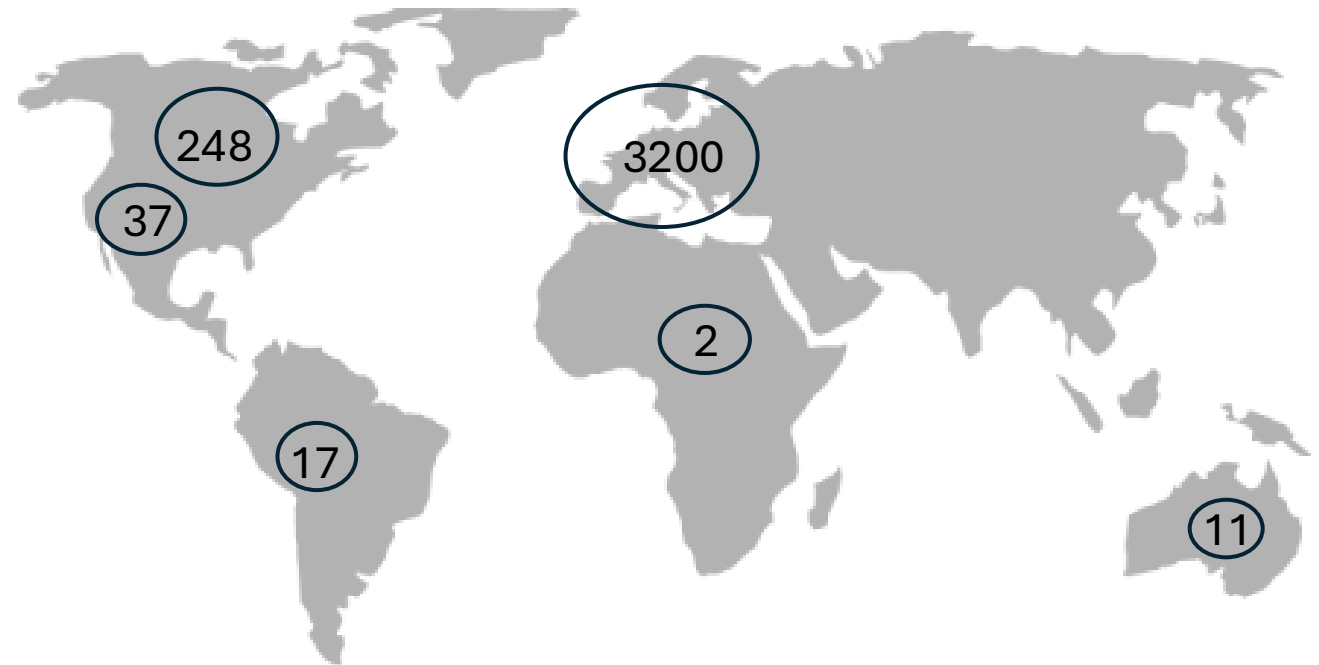
34 countries of production

Mostly European countries

Danmark 1008

Sweden 694

Germany 353



# What weeds were present in the seed lots?

378 weeds were present in the seed lots

Most common weeds:

Grasses:

annual meadow grass (*Poa annua*) 14,8%

festuca grasses (incl. *Vulpia*) 11,5%

ryegrasses *Lolium* 7,6%

Broad leafed plants:

lambsquarters (*Chenopodium album*) 15,8%

scentless mayweed (*Tripleurospermum inodorum*) 8,4%

alsikeclover (*Trifolium hybridum*) 7,5%



# Frequency of harmful weeds in the seed lots?



The frequency of studied harmful weeds in seed lots was under 1 % (from the total amount of seed lots).

There were many species, for example cereals, where harmful weeds were lacking totally.

































Is it possible to spot risk countries of production and risk species of seed lots where harmful weeds are more common?

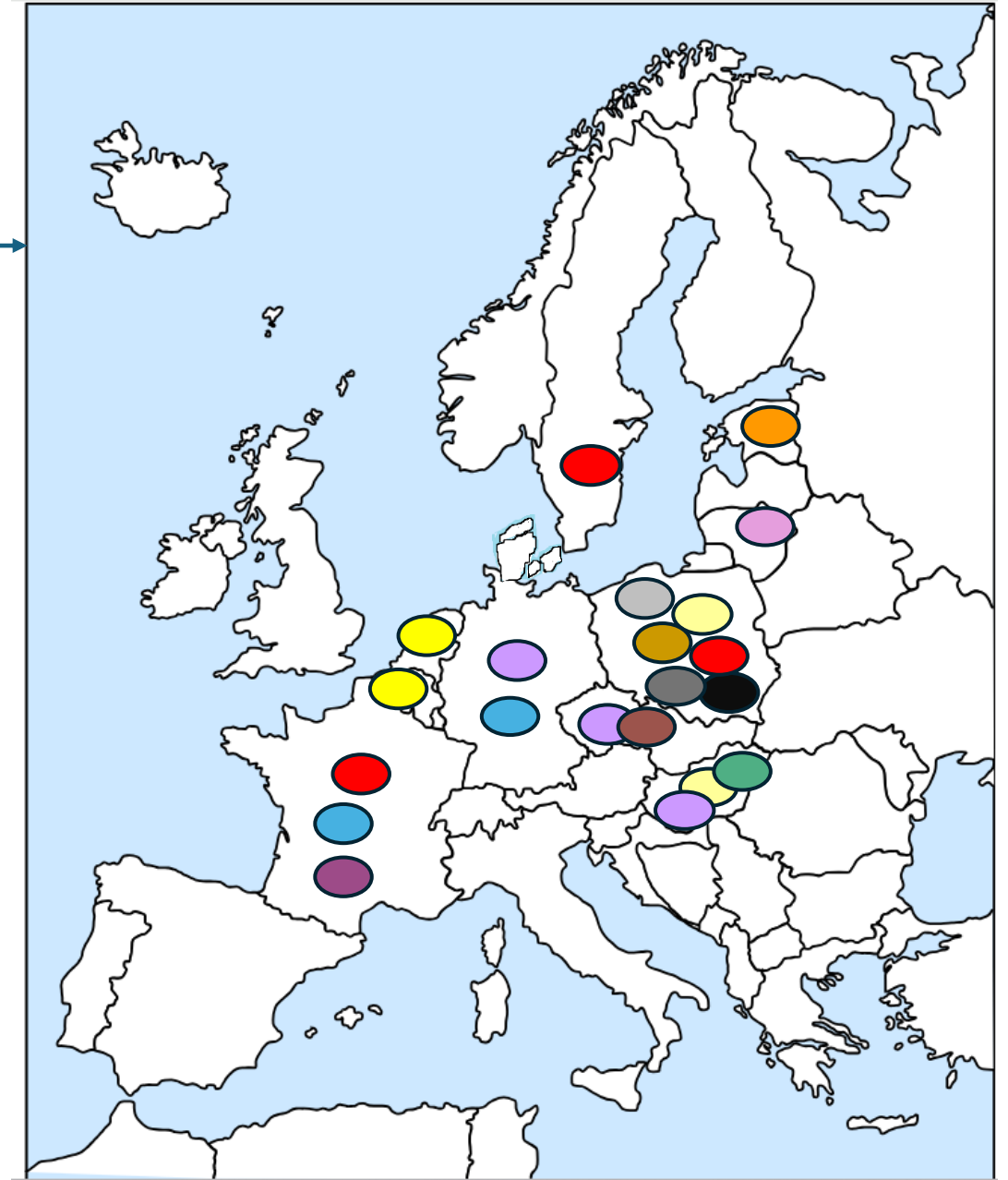
The information is important for seed importers in risk management.



# Barnyard grass



Netherlands	rape seed		Sweden	Red clover	
Belgium	rape seed		Germany	Phacelia	
Canada	Alfalfa ( <i>M.falcata</i> )		Germany	Alfalfa ( <i>M.falcata</i> )	
Canada	Alfalfa ( <i>M.falcata</i> )		Check Rep.	Phacelia	
Canada	Alfalfa ( <i>M.falcata</i> )		Check Rep.	Phacelia	
Canada	Perennial ryegrass		Check Rep.	Caraway	
Liethuania	Alsike clover		Hungary	Phacelia	
Poland	Red clover		Hungary	Phacelia	
Poland	Red clover		Hungary	Phacelia	
Poland	Yellow lupine		Hungary	Phacelia	
Poland	White mustard		Hungary	Phacelia	
Poland	Common vetch		Hungary	White mustard	
Poland	Italian ryegrass		Hungary	Oil radish	
Poland	Westervolds ryegrass		Estonia	Broad bean	
France	Red clover		USA	Italian ryegrass	
France	Alfalfa ( <i>M.falcata</i> )				
France	Persian clover				



# Barnyard grass – countries of production of the seed lot



Land of production of seed lot	%-of production lands imported seeds	Seed lots with barnyard grass	Total amount of production lands imported seed lots
Hungary	12,0	7	58
Poland	6,7	7	104
Belgium	6,2	1	16
France	2,7	3	110
USA	2,7	1	37
Check Republic	2,4	3	123
Canada	1,6	4	248
Netherlands	0,8	1	120
Lithuania	0,7	1	143
Germany	0,6	2	353
Estonia	0,5	1	185
Sweden	0,1	1	694



# Barnyard grass – seed lot's species

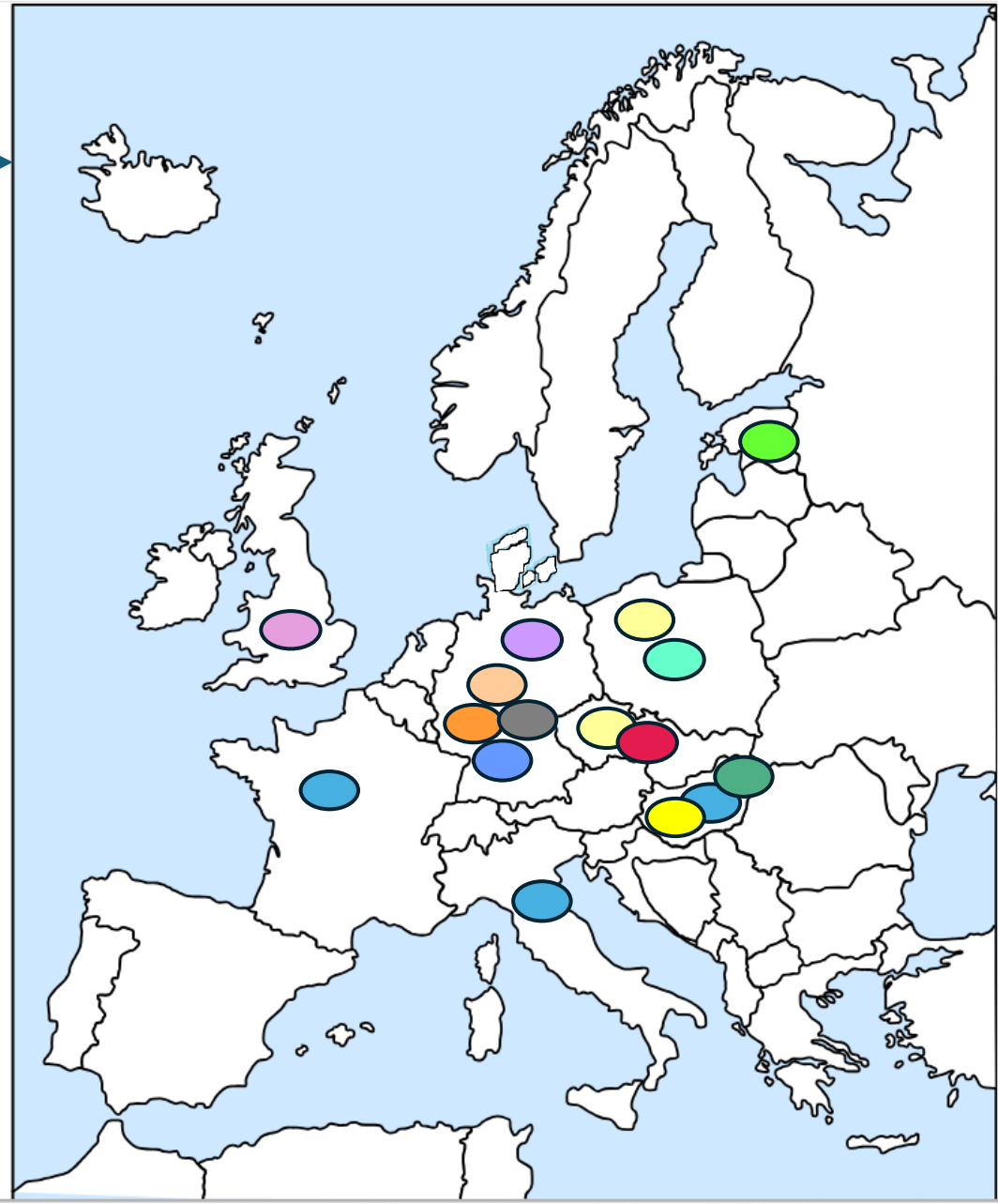
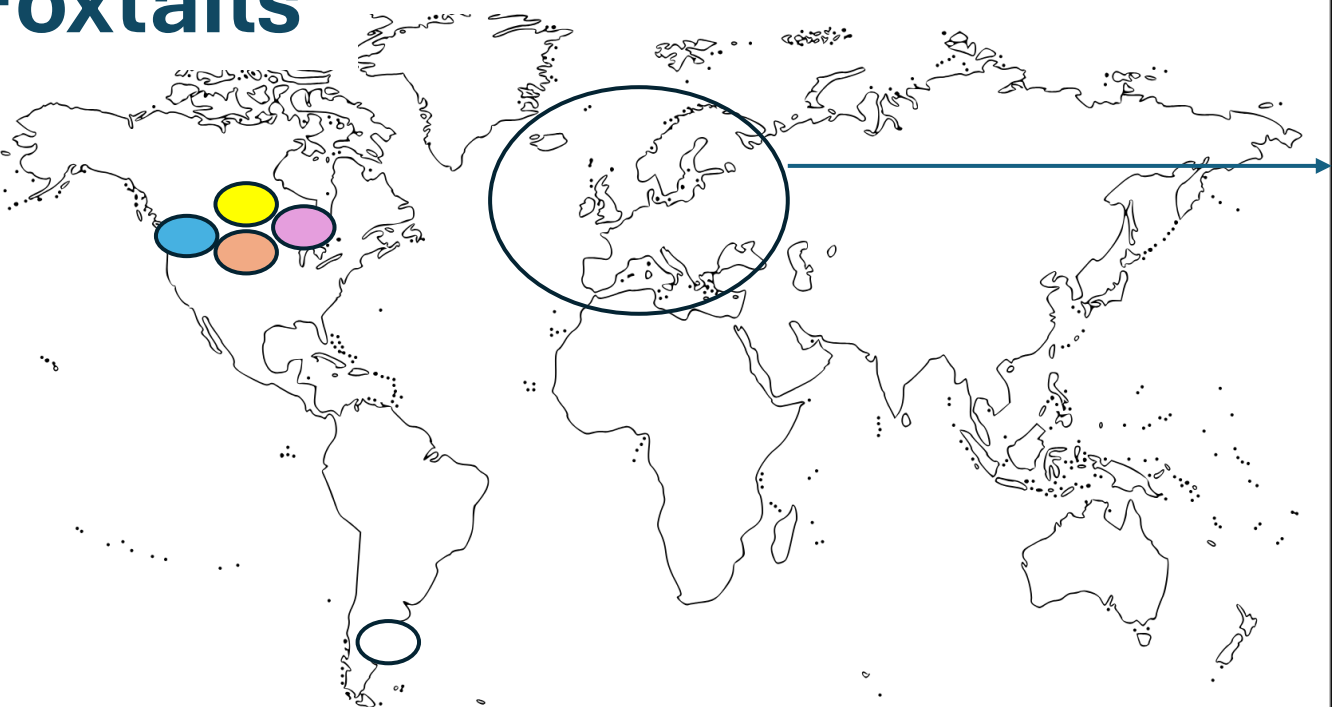


Seed lot species	%-of all the seed lots of concerning species	amount of seed lots where barnyardgrass was present	Total amount of species imported seed lots
Phacelia	15,7	8	51
Broad bean	14,2	1	7
Yellow lupine	11,1	1	9
White mustard	10,0	2	20
Alfalfa	5,6	5	90
Caraway	3,7	1	27
Rape seed	3,4	2	59
Persian clover	3,3	1	30
Westervolds ryegrass	3,1	1	32
Oil radish	2,4	1	41
Italian ryegrass	2,2	2	91
Common vetch	1,6	1	61
Red clover	1,2	4	336
Alsike clover	0,6	1	163
Perennial ryegrass	0,5	1	212

anomaly



# Foxtails



Argentina	White clover		Germany	Phacelia	
Italy	Alfalfa (M.falcata)		Germany	White melilot	
Canada	birdfoot trefoil		Germany	White melilot	
Canada	birdfoot trefoil		Germany	White melilot	
Canada	birdfoot trefoil		Germany	Common melilot	
Canada	Alfalfa (M.falcata)		Germany	Common melilot	
Canada	Alfalfa (M.falcata)		Germany	Camelina	
Canada	Alfalfa (M.falcata)		Germany	Reed canary grass	
Canada	Timothy		Check Rep.	White mustard	
Canada	Common millet		Check Rep.	Flax	
Poland	White mustard		UK	Common millet	
Poland	Westervolds ryegrass		Hungary	Alfalfa (M.falcata)	
France	Alfalfa (M.falcata)		Hungary	birdfoot trefoil	
			Hungary	Oil radish	
			Hungary	Oil radish	
			Estonia	Alfalfa (M.falcata)	

# Foxtails – countries of production

Land of production of seed lot	%-of production lands imported seeds	Seed lots with foxtail	Total amount of production lands imported seed lots
Argentina	9,1	1	11
Hungary	6,9	4	58
UK	5,2	1	19
Canada	3,2	8	248
Italy	2,3	1	44
Germany	2,2	8	353
Poland	1,9	2	104
Check republ	1,6	2	123
France	0,9	1	110
Estonia	0,5	1	185



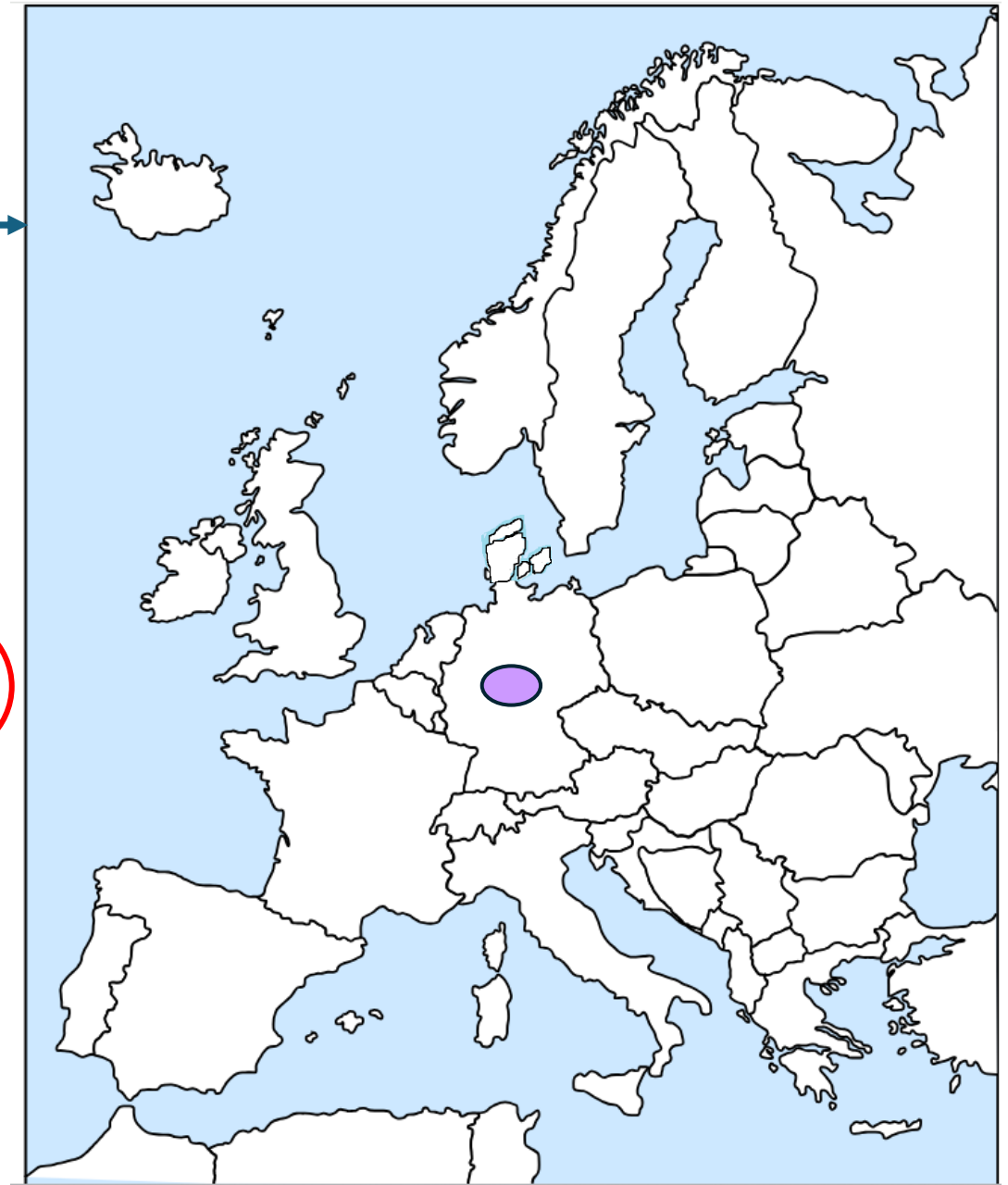
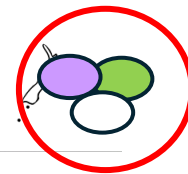
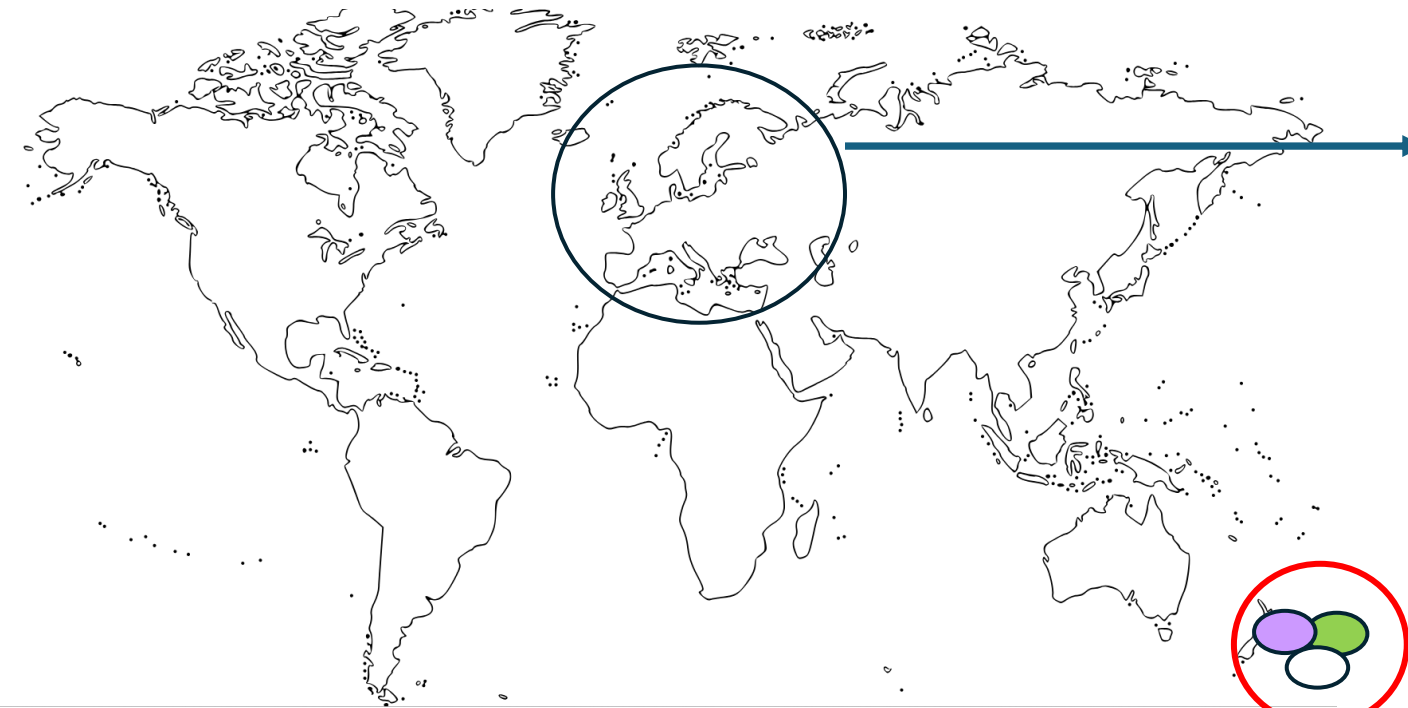
# Foxtails – seed lot's species












Seed lot species	%-of all the seed lots of concerning species	amount of seed lots where foxtail was present	Total amount of species imported seed lots
Common millet	100,0	2	2
Camelina	25,0	1	4
Common melilot	20,0	2	10
birdfoot trefoil	15,4	4	26
White melilot	12,0	3	25
Flax	11,2	1	9
White mustard	10,0	2	20
Alfalfa (M.falcata)	8,3	1	12
Alfalfa (M.sativa)	6,7	6	90
Oil radish	4,9	2	41
Reed canary grass	3,5	1	29
Westervolds ryegrass	3,1	1	32
White clover	0,4	1	243
Timothy	0,3	1	295
Phacelia	2,0	1	51



# Black nightshade

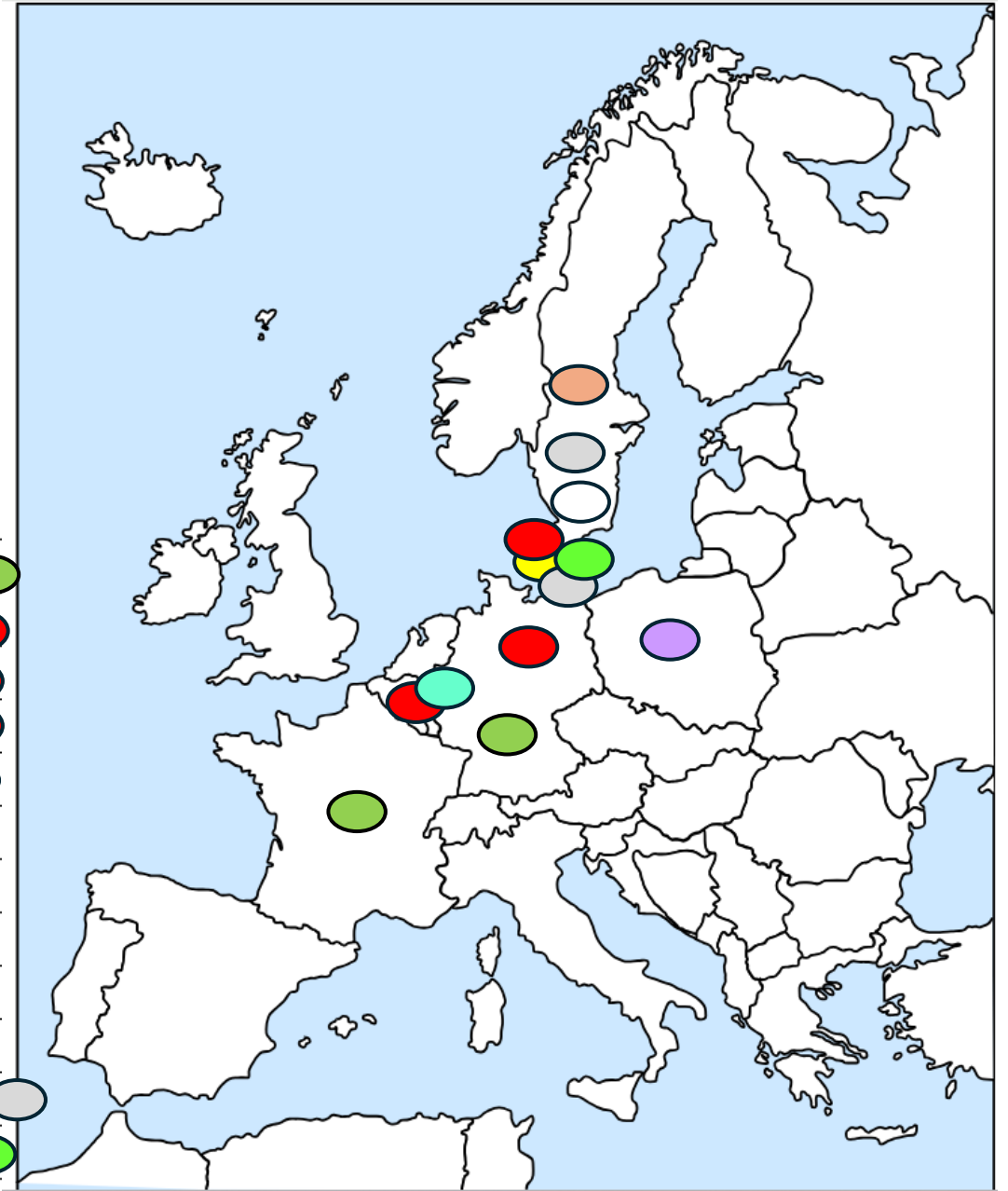


Germany	Phacelia	
New-Zealand	Phacelia	
New-Zealand	Phacelia	
New-Zealand	Forage chicory	
New-Zealand	White clover	
New-Zealand	White clover	
New-Zealand	White clover	
New-Zealand	White clover	
New-Zealand	White clover	

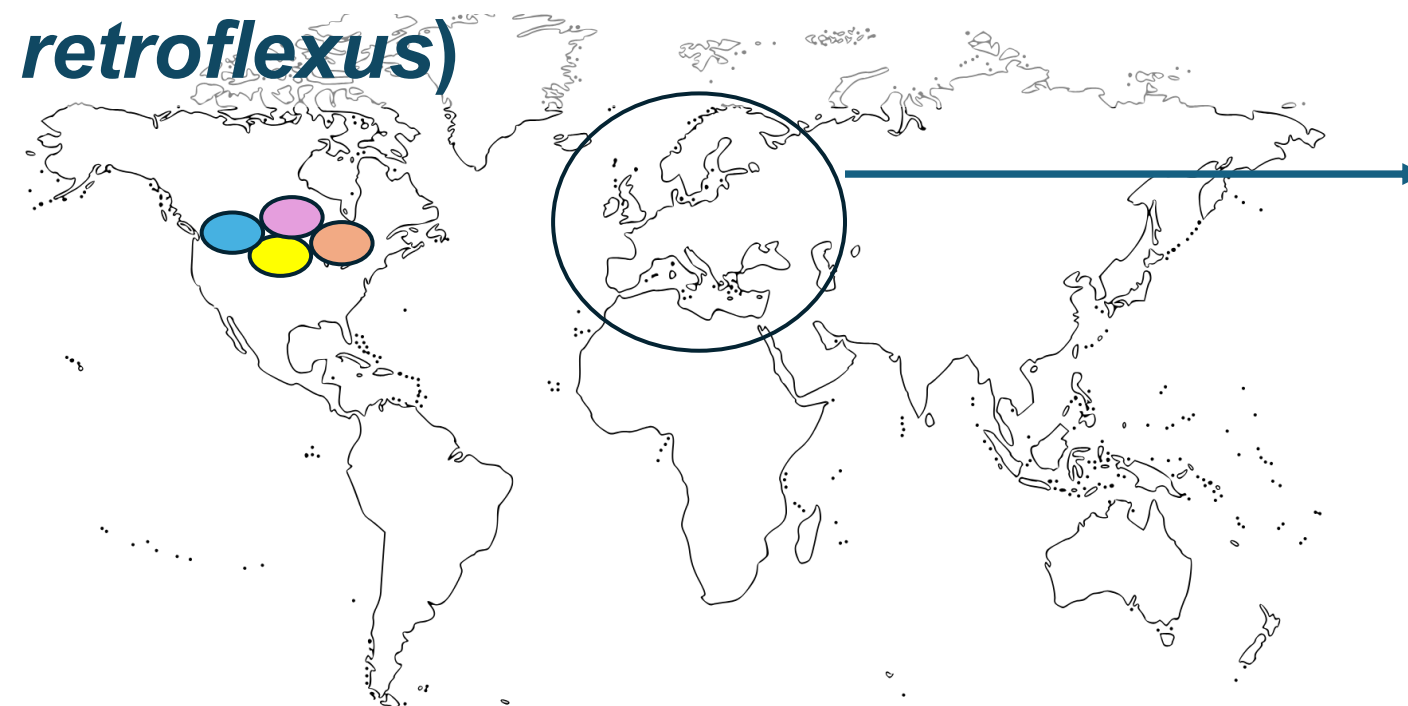
# Black grass (*Alopecurus myosuroides*)












Black Grass is possible severe weed for autumn sown cereals in Finland in the near future.

Belgium	Red fescue	●	Germany	Meadow fescue	●
Luxemburg	Italian ryegrass	●	Germany	Red fescue	●
Poland	Phacelia	●	Germany	Red fescue	●
France	Red fescue	●	Danmark	Red fescue	●
France	Red fescue	●	Danmark	Red fescue	●
France	Red fescue	●	Danmark	Red fescue	●
France	Red fescue	●	Danmark	Red fescue	●
France	Red fescue	●	Danmark	Red fescue	●
Sweden	Timothy	●	Danmark	Red fescue	●
Sweden	Timothy	●	Danmark	Red fescue	●
Sweden	Perennial ryegrass	●	Danmark	Perennial ryegrass	●
Sweden	White clover	●	Danmark	Cocksfoot	●
			Danmark	Cocksfoot	●



# Redroot amaranth (*Amaranthus retroflexus*)



Canada	birdfoot trefoil	
Canada	birdfoot trefoil	
Canada	birdfoot trefoil	
Canada	birdfoot trefoil	
Canada	birdfoot trefoil	
Canada	birdfoot trefoil	
Canada	Timothy	
Canada	Timothy	
Canada	Alfalfa ( <i>M.falcata</i> )	
Canada	Alsike clover	
Hungary	Alfalfa ( <i>M.falcata</i> )	

Redroot amaranth has not yet established as a weed in Finland, but is likely benefit from climate change

# Challenges in seed lot sorting

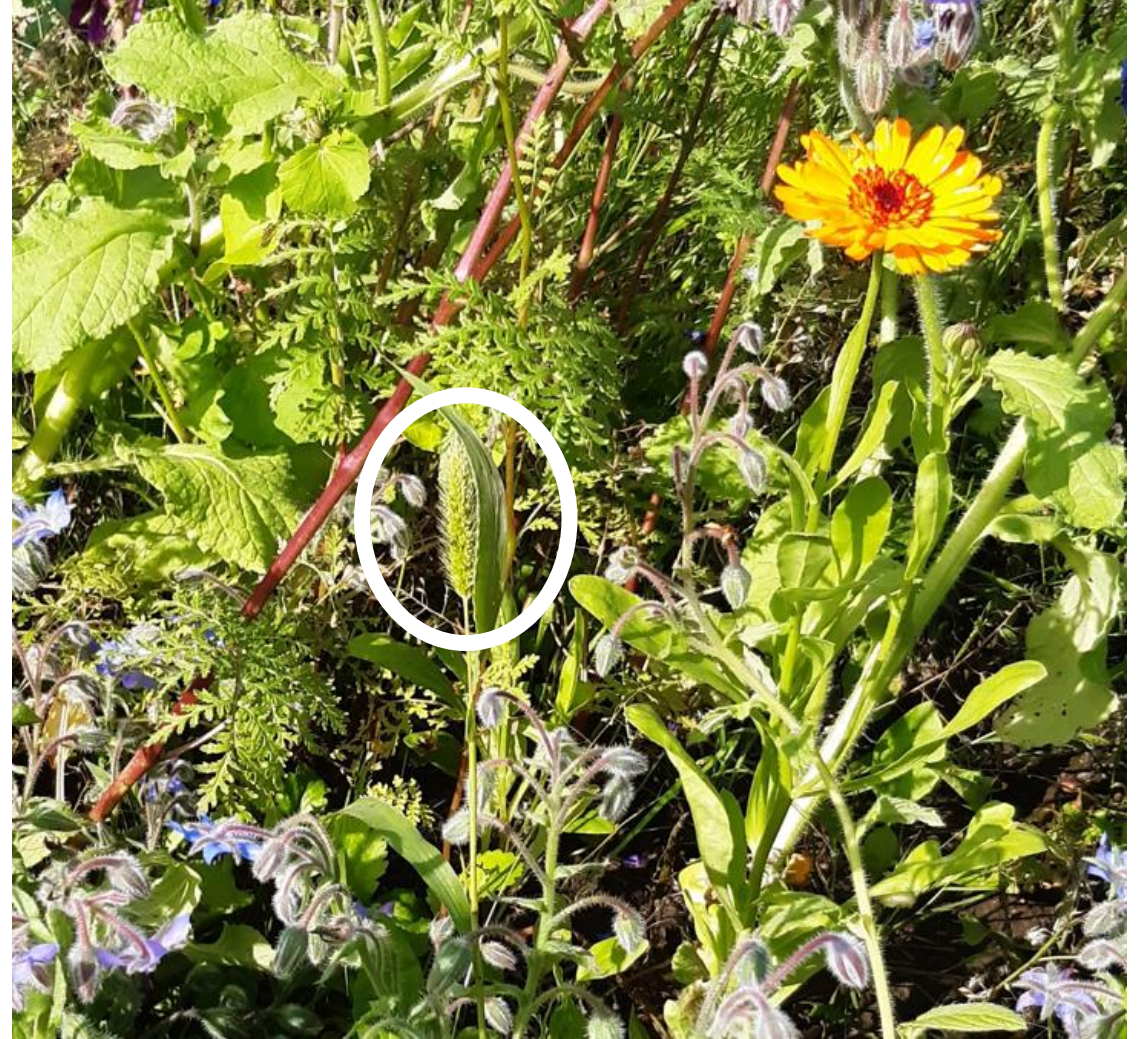


- Similarity (shape, weight, size) of seeds of weed and seed lots plant species causes that it is difficult to sort the weed out from the seed lot.



# Seed mixtures for biodiversity purposes

Some component in a mixture maybe species (for example flowers) in which are no certification requirements.



# Actions to prevent spreading

If a harmful weed is mentioned on a certificate, the Seed Unit informs the importer and encourage to take actions.

Seed importers have taken voluntary actions:

Checking of harmful weeds of the seed lot at import country or new sample is taken and analyzed in Finland.

If harmful weed is found (certificate or sample):  
new sorting of seed lot, recall of seed lots.

Important to send the information of harmful weed to seed lots buyers if already sold/sown – weed management actions at an early stage are important to prevent spreading.

There is a discussion in Finland if barnyard grass should be forbidden in national seed production.





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# Thank you

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